

**CLAIMS**

1. A polymer wherein at least 80% of the repeat units comprise
  - a) an ion-conducting region having an aromatic backbone of one or more aromatic groups, wherein at least one ion-conducting functional group is attached to each aromatic group; and
  - b) a spacer region having an aromatic backbone of at least four aromatic groups, wherein no ion-conducting functional groups are attached to the aromatic backbone,such that at least 80% of the polymer chain contains alternate ion-conducting and spacer regions along the length of the chain.
2. A polymer according to claim 1, wherein at least 95% of the repeat units comprise the ion-conducting region and the spacer region.
3. A polymer according to claim 1 or claim 2, wherein the one or more aromatic groups in the ion-conducting region are phenylene, naphthylene or anthracenylene groups.
4. A polymer according to any preceding claim, wherein each aromatic group in the aromatic backbone of the ion-conducting region is adjacent to an electron-donating group.
5. A polymer according to claim 4, wherein the electron-donating group is an ether group.
6. A polymer according to any preceding claim, wherein the at least one ion-conducting functional group is a sulphonic acid group.
7. A polymer according to any preceding claim, wherein the ratio of the number of aromatic groups in the spacer region to the number of aromatic groups in the ion-conducting region is at least 2:1.
8. A polymer according to any preceding claim, wherein the at least four aromatic groups in the spacer region are phenylene, naphthylene or anthracenylene groups.
9. A polymer according to any preceding claim, wherein the at least four aromatic groups in the spacer region are connected by electron-withdrawing groups.

10. A polymer according to claim 9, wherein the electron-withdrawing groups are sulphone or ketone groups.
11. A polymer according to any preceding claim, which has an equivalent weight of less than  $800\text{gmol}^{-1}$ .
12. A polymer according to any preceding claim, which has an inherent viscosity of greater than  $1.0\text{dl/g}$ .
13. A polymer solution comprising a polymer according to any one of claims 1 to 12.
14. A polymer electrolyte membrane comprising a polymer according to any one of claims 1 to 12.
15. An electrocatalyst layer on a substrate wherein the electrocatalyst layer comprises a polymer according to any one of claims 1 to 12.
16. A membrane electrode assembly comprising a polymer electrolyte membrane according to claim 14 and/or an electrocatalyst layer according to claim 15.